

WHAT IS CLAIMED IS:

1 1. A method of determining spatial target probability using a model of
2 multisensory processing by the brain, said method comprising the steps of:
3 acquiring at least two inputs from a location in a desired environment where
4 a first target is detected;
5 applying said inputs to a plurality of model units in a map corresponding to
6 a plurality of locations in said environment;
7 approximating a posterior probability of said first target at each of said
8 model units;
9 finding a model unit with a highest posterior probability;
10 choosing a location in said environment corresponding to said model unit
11 with a highest posterior probability as a location of a next target.

1 2. The method as defined in claim 1, wherein said at least two inputs
2 are sensory inputs.

1 3. The method as defined in claim 2, wherein said at least two sensory
2 inputs are video and audio inputs.

1 4. The method as defined in claim 1, wherein said posterior probability
2 is a conditional probability of said first target given said at least two inputs.

1 5. The method as defined in claim 4, wherein said posterior probability
2 is computed using Bayes' rule.

1 6. The method as defined in claim 5, wherein said posterior probability
2 is approximated using a sigmoid curve function.

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1 7. The method as defined in claim 5, wherein said posterior probability
2 is approximated using a linear function.

1 8. The method as defined in claim 5, wherein said posterior probability
2 is approximated using a bounded linear function.

1 9. The method as defined in claim 4, wherein said posterior probability
2 is approximated using a sigmoid curve function.

1 10. The method as defined in claim 4, wherein said posterior probability
2 is approximated using a linear function.

1 11. The method as defined in claim 4, wherein said posterior probability
2 is approximated using a bounded linear function.

1 12. The method as defined in claim 4, wherein said next target is the
2 same as said first target.

1 13. A method of determining spatial target probability using a neural
2 network model of multisensory processing by the brain, said method comprising the steps
3 of:

4 training a plurality model units in a map corresponding to a plurality of
5 locations in a desired environment to output a desired value when an actual target is
6 detected;

7 applying at least two inputs from said actual target in said desired
8 environment;

9 finding one of said model units with a highest desired value; and
10 choosing a location in said environment corresponding to said model unit
11 with said highest value as a location of said actual target.

1 14. The method as defined in claim 13, wherein said training step
2 includes:

3 positioning a training target at a random location in said desired
4 environment;

5 acquiring at least two inputs from said training target;

6 applying said at least two inputs said plurality model units in said map and
7 obtaining actual responses of said model units;

8 generating desired responses for said model units;

9 finding differences between said actual and desired responses; and

10 11 using back-propagation to reduce said differences between said actual and
desired responses.

1 15. A camera apparatus for automatically tracking a target in a known
2 environment, said system comprising:

3 at least one audio and at least one video sensors for receiving audio and
4 video signals from the target;

5 a controller for receiving said audio and video signals from said audio and
6 video sensors and determining a probability of the target being at a location in the
7 environment using a program modeling multisensory processing of the brain;

8 at least one of a moveable directional audio and video sensor for turning to
9 a location in the environment where a target probability is high as determined by said
10 controller.

1 16. The apparatus as defined in claim 15 wherein said modeling program
2 approximates a posterior probability of the target given said audio and video signals from
3 the target.

1 17. The method as defined in claim 16, wherein said posterior
2 probability is approximated using a linear function.

1 18. The method as defined in claim 16, wherein said posterior
2 probability is approximated using a bounded linear function.

1 19. The method as defined in claim 16, wherein said posterior
2 probability is approximated using a sigmoid curve function.

1 20. The apparatus as defined in claim 15 wherein said modeling program
2 approximates Bayes' rule for calculating target probability given said audio and video
3 signals from the target.

1 21. The method as defined in claim 20, wherein said Bayes' rule is
2 approximated using a linear function.

1 22. The method as defined in claim 15, wherein said Bayes' rule is
2 approximated using a bounded linear function.

1 23. The method as defined in claim 15, wherein said Bayes' rule is
2 approximated using a sigmoid curve function.

1 24. The apparatus as defined in claim 15 wherein said modeling program
2 estimates said target probability by training a

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